

What is claimed is:

- 1 1. A method for performing array microcrystallizations to determine  
2 suitable crystallization conditions for a molecule, the method comprising:  
3 forming an array of microcrystallizations, each microcrystallization  
4 comprising a drop comprising a mother liquor solution whose composition  
5 varies within the array and a molecule to be crystallized, the drop having a  
6 volume of less than 1 microliter;  
7 storing the array of microcrystallizations under conditions suitable  
8 for molecule crystals to form in the drops in the array; and  
9 detecting molecule crystal formation in the drops by taking images  
10 of the drops.
- 1 2. The method according to claim 1 wherein taking images of the drops  
2 comprises taking a single image of each drop.
- 1 3. The method according to claim 1 wherein taking images of the drops  
2 is performed without having to adjust a focus of an optical system taking the  
3 images.
- 1 4. The method according to claim 3 wherein taking images of the drops  
2 comprises taking a single image of each drop.
- 1 5. The method according to claim 1 wherein the molecule is a  
2 macromolecule.

- 1 6. The method according to claim 1 wherein the molecule is a protein.
- 1 7. The method according to claim 1 wherein the macromolecule has a  
2 molecular weight of at least 500 daltons.
- 1 8. The method according to claim 1 wherein the drop has a volume of  
2 less than about 750 nL.
- 1 9. The method according to claim 1 wherein the drop has a volume of  
2 less than about 500 nL.
- 1 10. The method according to claim 1 wherein the drop has a volume of  
2 less than about 250 nL.
- 1 11. The method according to claim 1 wherein the drop has a volume of  
2 between about 1 nL - 750 nL.
- 1 12. The method according to claim 1 wherein the drop has a volume of  
2 between about 1 nL - 500 nL.
- 1 13. The method according to claim 1 wherein the drop has a volume of  
2 between about 1 nL - 250 nL.
- 1 14. The method according to claim 1 wherein each microcrystallization  
2 further includes a volume of mother liquor solution separate from  
3 the drop, the mother liquor solution contained in the volume having  
4 the same

5 composition as the mother liquor solution contained in the drop, the volume  
6 comprising less than about 500 mL of the mother liquor solution.

1 15. The method according to claim 1 wherein each microcrystallization  
2 further includes a volume of mother liquor solution separate from the drop,  
3 the mother liquor solution contained in the volume having the same  
4 composition as the mother liquor solution contained in the drop, the volume  
5 comprising less than about 250 mL of the mother liquor solution.

1 16. The method according to claim 1 wherein the mother liquor  
2 solutions have at least 4 components which are varied within the array.

1 17. The method according to claim 1 wherein the mother liquor  
2 solutions have at least 5 components which are varied within the array.

1 18. The method according to claim 1 wherein the array includes greater  
2 than 96 microcrystallizations.

1 19. The method according to claim 1 wherein the array includes greater  
2 than 192 microcrystallizations.

1 20. The method according to claim 1 wherein forming the array of  
2 microcrystallizations includes using greater than 48 stock solutions to form  
3 the mother liquor solutions used in the array.

1 21. The method according to claim 1 wherein forming the array of  
2 microcrystallizations includes using greater than 96 stock solutions to form  
3 the mother liquor solutions used in the array.

1 22. The method according to claim 1 wherein forming the array of  
2 microcrystallizations includes using greater than 192 stock solutions to form  
3 the mother liquor solutions used in the array.

1 23. The method according to claim 1 wherein forming the array of  
2 microcrystallizations includes forming the drops within a volume range of  
3 less than about 25 nL.

1 24. The method according to claim 1 wherein forming the array of  
2 microcrystallizations includes forming the drops within a volume range of  
3 less than about 20 nL.

1 25. The method according to claim 1 wherein forming the array of  
2 microcrystallizations includes forming the drops within a volume range of  
3 less than about 15 nL.

1 26. A method for performing array microcrystallizations to determine  
2 suitable crystallization conditions for a molecule, the method comprising:  
3 forming an array of microcrystallizations, each microcrystallization  
4 comprising a hanging drop comprising a mother liquor solution whose  
5 composition varies within the array and a molecule to be crystallized, the  
6 drop having a volume of less than 1 microliter;  
7 storing the array of microcrystallizations under conditions suitable

8 for molecule crystals to form in the drops in the array; and  
9 detecting molecule crystal formation in the drops by taking images  
10 of the drops.

1 27. The method according to claim 26 wherein taking images of the  
2 drops comprises taking a single image of each drop.

1 28. The method according to claim 26 wherein taking images of the  
2 drops is performed without having to adjust a focus of an optical system  
3 taking the images.

1 29. The method according to claim 28 wherein taking images of the  
2 drops comprises taking a single image of each drop.

1 30. A method for performing array microcrystallizations to determine  
2 suitable crystallization conditions for a molecule, the method comprising:  
3 forming an array of microcrystallizations, each microcrystallization  
4 comprising a sitting drop comprising a mother liquor solution whose  
5 composition varies within the array and a molecule to be crystallized, the  
6 drop having a volume of less than 1 microliter;  
7 storing the array of microcrystallizations under conditions suitable  
8 for molecule crystals to form in the drops in the array; and  
9 detecting molecule crystal formation in the drops by taking images  
10 of the drops.

1 31. The method according to claim 30 wherein taking images of the  
2 drops comprises taking a single image of each drop.

1 32. The method according to claim 30 wherein taking images of the  
2 drops is performed without having to adjust a focus of an optical system  
3 taking the images.

1 33. The method according to claim 32 wherein taking images of the  
2 drops comprises taking a single image of each drop.

1 34. A method for performing array microcrystallizations to determine  
2 suitable crystallization conditions for a molecule, the method comprising:  
3 forming an array of microcrystallizations, each microcrystallization  
4 comprising a microcrystallization volume comprising a mother liquor  
5 solution whose composition varies within the array and a molecule to be  
6 crystallized, the microcrystallization volume having a volume of less than 1  
7 microliter;  
8 storing the array of microcrystallizations under conditions suitable  
9 for molecule crystals to form in the microcrystallization volumes; and  
10 detecting molecule crystal formation in the microcrystallization  
11 volumes by taking images of the microcrystallization volumes.

1 35. The method according to claim 34 wherein taking images of the  
2 microcrystallization volumes comprises taking a single image of each  
3 microcrystallization volume.

1 36. The method according to claim 34 wherein taking images of the  
2 microcrystallization volumes is performed without having to adjust a focus  
3 of an optical system taking the images.

1 37. The method according to claim 36 wherein taking images of the  
2 microcrystallization volumes comprises taking a single image of each  
3 microcrystallization volume.

1 38. The method according to claim 37 wherein the molecule is a  
2 macromolecule.

1 39. The method according to claim 37 wherein the molecule is a  
2 protein.

1 40. The method according to claim 37 wherein the macromolecule has a  
2 molecular weight of at least 500 daltons.

1 41. The method according to claim 37 wherein the microcrystallization  
2 volume has a volume of less than about 750 nL.

1 42. The method according to claim 37 wherein the microcrystallization  
2 volume has a volume of less than about 500 nL.

1 43. The method according to claim 37 wherein the microcrystallization  
2 volume has a volume of less than about 250 nL.

1 44. The method according to claim 37 wherein the microcrystallization  
2 volume has a volume of between about 1 nL - 750 nL.

1 45. The method according to claim 37 wherein the microcrystallization  
2 volume has a volume of between about 1 nL - 500 nL.

1 46. The method according to claim 37 wherein the microcrystallization  
2 volume has a volume of between about 1 nL - 250 nL.

1 47. The method according to claim 37 wherein the mother liquor  
2 solutions have at least 4 components which are varied within the array.

1 48. The method according to claim 37 wherein the mother liquor  
2 solutions have at least 5 components which are varied within the array.

1 49. The method according to claim 37 wherein the array includes  
2 greater than 96 microcrystallizations.

1 50. The method according to claim 37 wherein the array includes  
2 greater than 192 microcrystallizations.

1 51. The method according to claim 37 wherein forming the array of  
2 microcrystallizations includes using greater than 48 stock solutions to form  
3 the mother liquor solutions used in the array.

1 52. The method according to claim 37 wherein forming the array of  
2 microcrystallizations includes using greater than 96 stock solutions to form  
3 the mother liquor solutions used in the array.



1 53. The method according to claim 37 wherein forming the array of  
2 microcrystallizations includes using greater than 192 stock solutions to form  
3 the mother liquor solutions used in the array.

1 54. The method according to claim 37 wherein forming the array of  
2 microcrystallizations includes forming the microcrystallization volumes  
3 within a volume range of less than about 25 nL.

1 55. The method according to claim 37 wherein forming the array of  
2 microcrystallizations includes forming the microcrystallization volumes  
3 within a volume range of less than about 20 nL.

1 56. The method according to claim 37 wherein forming the array of  
2 microcrystallizations includes forming the microcrystallization volumes  
3 within a volume range of less than about 15 nL.